

## Report: Python MCQ Application Project

### Introduction

This project is a quiz app for computer science students. It lets users take multiple-choice tests, tracks their scores, and saves their history. The app runs in the console, making it easy to use without a fancy interface. Admins can add new questions, and users can pick topics like Python or Cybersecurity.

### How It Works

### Technical Stuff

- **User Management:** When you start the app, you type a username. If you're new, it creates a profile. Returning users see their past scores and test dates. All this is saved in a JSON file.
- **Questions & Answers:** Questions are stored in a JSON file, split into categories. Each question has three options, and the app checks if your answer is correct.
- **Taking the Quiz:** You pick a category (or choose "All"), answer questions one by one, and get immediate feedback. After finishing, your score is saved.
- **Admin Features:** Admins (like "riad" or "foued") can add new questions to any category.
- **JSON Files:** Used for storing users and questions because it's simple and works well with Python.
- **Classes & Functions:** The main class MCQApplication handles everything—loading data, running quizzes, saving results. Functions are split into smaller tasks (e.g., `load_users()`, `run_test()`) to keep the code clean.
- **Input Validation:** The app forces you to type valid answers (a/b/c) and checks if usernames or categories exist.

### Under the Hood (But Keepin' It Simple)

#### 1. Starting Up

- Open the app, and it's like, "Yo, what's your username?"
- If you've used it before, it digs up your past scores and test dates from a JSON file (think of it as a digital notebook that never forgets).
- New user? No biggie. It creates a profile for you on the spot.

#### 2. Taking the Quiz

- Pick a category (like "Python" or "Algorithms") or go full chaos mode with "All Categories."
- The app grabs questions from the JSON file, shuffles them (so you don't memorize the order), and fires them at you one by one.
- Each question has three options (a, b, c). If you try typing something dumb like "z" or "🍕," it'll keep bugging you until you pick a real answer.

#### 3. Feedback & Scores

- After each question, it instantly tells you if you nailed it or faceplanted. If you messed up, it shows the correct answer so you can learn.
- At the end, it slaps your final score on the screen ("14/20! Almost there!") and saves it to your profile.

#### 4. Admin Stuff

- Admins (like “riad” or “foued”) get a secret menu to add new questions. They pick a category, type the question + options, and tag the right answer. The app tucks it into the JSON file so everyone else gets to sweat over it later.

## 5. Extras

- **Export Scores:** You can dump your entire quiz history into a CSV file (aka a spreadsheet for nerds). Handy for bragging rights or tracking progress.
- **History Tracking:** Every test you take gets logged with the date, category, and score. It's like a workout log but for your brain.
- **Random Questions:** Uses `random.sample()` to pick questions without repeats. No one wants the same quiz twice.

## Stuff That Went Wrong (And How We Fixed It)

1. **Missing Files:** If the JSON files got deleted, the app would crash. Fixed it by adding error messages like “Hey, where’d the questions go?!” and checking if files exist.
2. **Broken History:** Sometimes the app forgot to save scores. Solved by updating the user's profile immediately after each test.
3. **Admin Drama:** Hardcoding admin usernames (like “riad”) wasn't secure, but it works for a school project. Maybe upgrade later.
4. **Category Glitches:** If you typed a category that didn't exist, the app would freak out. Added checks to say “Nope, that category's not real” before starting the quiz.

## Cool Features

- **Category Selection:** Pick your poison—Python, AI, Cybersecurity, etc.
- **Instant Feedback:** No waiting to see if you're right or wrong.
- **CSV Export:** For folks who love spreadsheets.
- **Admin Mode:** Add new questions without touching the code.

## Testing (We Tried to Break It)

- **Fake Users:** Made accounts like “QuizMaster3000” and “Noob123” to see if scores saved.
- **Invalid Inputs:** Typed “potato” as an answer. The app just yelled “Nope, pick a/b/c!”
- **Edge Cases:** Took quizzes with all correct/wrong answers. The app didn't explode (thankfully).
- **CSV Checks:** Opened exported files in Excel to make sure dates and scores lined up.

## Why It's Awesome

- **Learn Anywhere:** No fancy graphics? No problem. The console interface lets you focus.
- **Progress at a Glance:** Watch your scores climb over time. *“Look, Ma, I'm improving!”*
- **Admin-Friendly:** Adding questions is as easy as typing a text message.



## Features Added

- User login/history tracking.
- Category selection and random question pulls.

- Score feedback with correct/incorrect answers.
- Export results to CSV.
- Admin question adding.

### Final Thoughts

This app does what it needs to: lets students grind through MCQs and track their progress. It's not trying to win beauty contests it's here to make learning *stick*. Whether you're cramming for an exam or just geeking out over Python, it's got your back. The code's clean, the features are practical .